

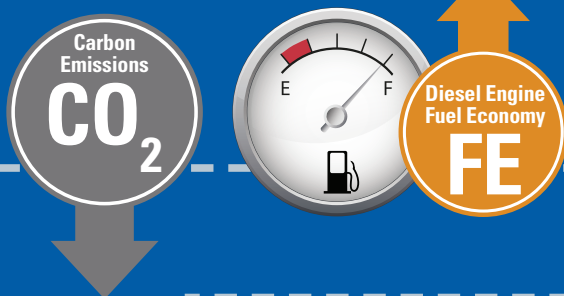


# Your Path to PC-11 Made Simple

# 1

## NEW STRICTER ENGINE REGULATIONS

Stricter greenhouse gas (GHG) regulations for diesel engines start in 2017 – requiring improvements in fuel economy and lowering of CO<sub>2</sub> emissions.



# 2

## ENGINE DESIGN & TECHNOLOGY

Diesel engine design is undergoing a period of significant change, driven by new CO<sub>2</sub> and fuel economy regulations. Changes include:

- + Diesel engine downsizing – 15L to 13L
- + Downspeaking – 1,600 rpm to 1,200 rpm
- + Advanced combustion design
- + Active oil temperature control
- + Variable valve timing
- + Start/Stop technology

# 3

## DIESEL ENGINE OIL IMPORTANCE

Diesel engine oils have a vital role:

- + Enabling new advancements in diesel engine hardware design
- + Increasing fuel economy through lighter viscosity grade and friction modifiers
- + Improving engine durability with new advanced additive chemistry and base oil selection



# 4

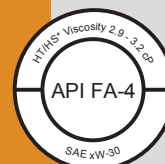
## PC-11 NEW DIESEL ENGINE OIL CATEGORY

A new category designed to surpass the performance of API CJ-4 oils while delivering better fuel economy.



**PC-11A:** Normal HT/HS viscosity – backwards compatible with new and older engines - replaces API CJ-4 engine oils.

On **December 1st, 2016**, these new oils will license as **API CK-4**



**PC-11B:** Lower HT/HS viscosity – ultra low viscosity fluids for new 2016 diesel engines - Maximizing fuel economy at lower viscosity grades.

On **December 1st, 2016**, these new oils will license as **API FA-4**

# 6

# Delo

## DELO 400 PERFORMANCE + PC-11

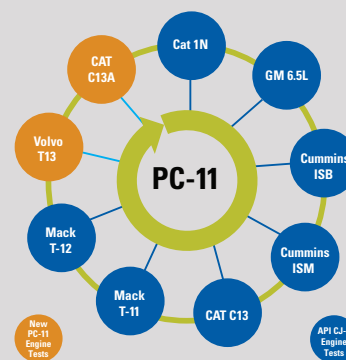
Chevron will introduce a wide range of PC-11 Delo<sup>®</sup> 400 products for our customer's operational needs. They will provide:

- + World class wear protection
- + Increased oxidative stability
- + Improved shear stability versus API CJ-4 oils
- + Better fuel economy versus API CJ-4 oils
- + Exceptional extended oil drain performance
- + Enhanced emission catalyst life

# 5

## PC-11 ENGINE TESTING

PC-11 will encompass previous API CJ-4 and new diesel engine testing for licensing qualification. These engine test stands include:



\*High Temperature/High Shear Viscosity (cP or mPa's @150° C)



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